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ABSTRACT

The College of Education at Indiana University of Pennsylvania (IUP) received a three-year grant to conduct research and evaluate video conferencing as a tool for reducing costs of supervising clinical experiences in the teacher education program. The goal was to determine whether quality supervision can be achieved and high levels of student teacher achievement maintained. Millcreek Township School District (Erie, Pennsylvania) was an ideal place to launch this work; the district is an Apple School of Tomorrow and a technology partner with IUP. Equipment and networking needs included three essential elements: a CODEC unit, a network, and a room. The project was designed in three phases: (1) a pilot study to provide feedback for modifying and expanding the second and third phases; (2) participation by 14 student teachers, their respective university supervisors, and site-based cooperating teachers; and (3) increasing the number of wired sites to three and the number of participating students to at least 24. Data for follow-up evaluation were collected from two university professors, three cooperating teachers, and three student teachers. Preliminary findings indicate the effectiveness of video conferencing for student teaching supervision. (AEF)

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Using Video Conferencing to Supervise Student Teachers

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The cost of supervising student teachers has become a concern for colleges and universities across the nation. The impending teacher shortage means that already large programs will grow even larger. Already overwhelmed local schools will feel the impact even more seriously. In addition, the demand for more diversity of experience means that most teacher education programs, especially those of universities located in rural areas, find it necessary to place student teacher farther and farther away from their main campuses. The idea of supervising clinical experiences of pre-service teachers using video conferencing grew out of a need to reduce costs associated with teacher education. It takes about $14000 a year to educate each teacher candidate at Indiana University of Pennsylvania (IUP). Costs will escalate as demands for less reliance on local schools and more diverse experiences continue to increase.

IUP places student teachers in 150+ school districts from Pittsburgh to Philadelphia and from Bedford to Erie, an area of more than 60,000 square miles. It has also developed partnerships with Indian reservations as far away as North Dakota and Arizona, and has partnership schools in Great Britain and Western Europe. Supervision in these distant sites is both costly and time intensive. In most cases, the faculty must be away from regular duties for two or three days; but in some cases, supervision requires them to be away for extended periods and they must arrange teaching and research activities accordingly.

Attempts to reduce financial burdens to the College of Education and ease faculty stress by using site-based supervisors from local colleges and universities have fallen short. In the best situations supervisors may not be fully familiar with the teacher education program at IUP so supervision does not meet desired standards; in the worst instances, contracted supervisors have failed to visit their student teachers even one time during the 14 week experience, which is unacceptable at a university noted for a quality teacher preparation program.

One solution that has shown promise is use of video conferencing to supervise student teachers in distant locations. The College of Education at IUP received a three-year grant from the United States Department of Education, Fund for the Improvement of Postsecondary Education (FIPSE), to conduct research and evaluate video conferencing as a tool for reducing costs of supervising clinical experiences in the teacher education program at IUP. The goal is to determine whether quality supervision can be achieved and high levels of student teacher achievement maintained.

Millcreek Township School District in Erie, Pennsylvania seemed an ideal place to launch this work. Millcreek is an Apple School of Tomorrow and a technology partner with IUP. The district was involved in many technology exchanges with IUP, from meetings to in-service education for teachers to "teach-ins" by secondary science students; but no student teachers had been placed there.

The District had the potential of providing an outstanding experience for student teachers from IUP, but the District's location, about two and one-half hours away from IUP, was a limiting factor. Placing student teachers in this highly desirable setting was especially difficult because traditional supervision was nearly impossible given winter weather conditions in northwestern Pennsylvania. Discussions of ways to resolve the problem gave way to planting the seeds for this project.

Equipment and Networking Needs

What does it take to make supervision by video conferencing work? It takes dedicated work of professionals and technical staff, plus equipment and a network. The facility includes three essential elements: a CODEC unit, a network, and a room (Brooksby, 1994).

One CODEC unit must be installed at each of the two or more sites in the video conferencing network. The CODEC digitizes and compresses video and audio signals for transmission (Brooksby, 1994). Working together, each CODEC sends and receives signals.

Compatibility between different manufacturer's CODEC units has been a problem. Users had to have the same manufacturer's CODEC unit at all sites to communicate. Recently, the industry has established standards of compatibility (H. 320) to permit communication world wide

between different manufacturer's CODEC units. Also, video conferencing equipment now combines key components into a single system. Cameras, microphones, monitors, speakers, and control panels are integrated into one easily moveable unit. When considering video conferencing CODEC units, make sure that it has the international video conferencing standards of ITU-T H.320.

Support equipment needed to obtain maximum usage from a system should include a document camera, wireless clip-on microphone for instructors (or student teachers), table or ceiling mounted microphones for participants (classroom students), an auxiliary camera (for more than one camera angle), and a VCR designed to tape or show videos. Additional monitors may be used also to facilitate the interactions of large groups

The network transmits information to and from CODEC units. A variety of formats can accomplish this task, including fiber optics, ISDN lines, and TI (T-one) lines

Fiber optics—A communication medium based on laser transmission. Glass or plastic fiber carries light to transmit video or audio data signals. Each fiber can carry 0 to 150 megabits of digital information per second or 1,000 voice channels. Transmission can be simplex (one-way) or duplex (two-way) voice data and video service (Portway, 1994).

ISDN lines—The Integrated Services Digital Network is a set of standards that transform an ordinary telephone line into a high speed data line capable of carrying information at 50 times the speed of conventional phone service. ISDN lines can carry extraordinary amounts of information (Hetrick, 1994).

TI Lines—These high-speed digital data carriers deliver very high quality visuals, but are more expensive to use than ISDN lines.

ISDN lines were chosen because of their availability in Western Pennsylvania. Three lines provide a transmission rate of 386 KBS, an acceptable speed for transmitting video signals. Lower compression levels have a lower price tag for each hour of video conferencing; but the cost is slower transmission time with poorer real time representation.

ISDN lines at low levels of compression, however, can produce satisfactory quality video, especially for visuals without significant amounts of motion. Motions appear jerky, with a "tail-like" appearance. Experience has shown, though, that slightly lower quality visuals do not negatively affect viewer's participation for educational purposes.

ISDN lines are also fairly inexpensive to operate. They are roughly equivalent in price to two times the cost of a long distance phone call to the same site (each ISDN line has two channels).

The most significant way to reduce the cost of operation is to do careful planning. Events should be preplanned, carefully timed, and based on clear objectives. Using these tips will mean moving smoothly from point to point in video conferencing activities ranging from group discussions to the supervision of student teachers.

Research and Evaluation

This project is designed to occur in three phases. The first was a pilot study to provide feedback for modifying and expanding the second and third phases. During phase one, three student teachers, three cooperating teachers, and two university supervisors volunteered to participate. Phase two, currently underway, involves 14 student teachers and their respective university supervisors and site based cooperating teachers. In phase three the number of "wired" sites will increase to three and the number of participating student teachers will increase to at least twenty-four. In each instance, a control group of carefully matched cohorts, who are participating in traditional site-based supervision, are providing data also.

Data were collected from participants in each of the three categories: student teachers, cooperating teachers, and university supervisors. A control group matched on all salient characteristics provided comparison data for the study. Pre- and post-experience data were collected about participants' attitude toward, use of, and satisfaction with technology-based supervision of student teaching. Although a cost analysis was also conducted, the analysis of those data is not complete.

These data were useful in guiding the planning process for Phase II of the project. Project staff have elected to report them, because they could be helpful, as well, to others considering the use of video conferencing to accomplish activities not normally associated with the technology.

Analysis of Attitude, Use, and Satisfaction Data

University Supervisors

Data for follow up evaluation were collected from two university supervisors, three cooperating teachers, and three student teachers. Each was asked to complete 14 questions on a written questionnaire. The outside evaluator for the project reviewed the questionnaires for completeness, clearness, and comprehensiveness. Questions were designed as closed-ended, open-ended, and Likert-type. All participants responded to all questions, making all data usable for the purpose of analysis. The small N for Phase I limits reliability of the conclusions and generalizability of results, however.

Two university supervisors, with 12 and 9 years of experience respectively, reported supervising between 25 and 30 student teachers to date. Both reported this experience as their first using video conferencing to supervise student teachers. Each reported using it to supervise her student teacher over five times during the semester. Observations lasted between 30 and 40 minutes.

Video conferencing was also used to conduct planning conferences, pre-conferences, and post-conferences. The 2 to 5 planning conferences for each supervisor and student each lasted about 10 minutes. Pre-observation conferences also numbered between 2 and 5 and lasted between 10 and 15 minutes. Between 2 and 5 post-observation conferences were held and lasted between 10 and 20 minutes on average.

One supervisor held both midterm and final evaluations using video conferencing. the other only the final one—she felt compelled to make her midterm in person due to perceived problems with the use of video conferencing in a special education classroom setting

Both report many positive aspects of using video: (1) it saved time; (2) they liked being part of an innovative project; (3) they developed skill in using video conferencing for future activities; and, (4) they like the collaborative nature of the IUP/Millcreek partnership. One also identified these: an otherwise unavailable site was made available, a definite schedule of observation was established, comfort and confidence levels increased with use of technology, and information from the experience was incorporated into a methods of teaching class.

Some less positive aspects of using video conferencing to supervise student teachers were also noted. Both suggested the audio quality was not adequate, a finding consistent with those from evaluation of the pre-student teaching experiences reported in an earlier annual report. At least one reported that technical difficulty with the ISDN lines and the ability of the local telephone company to deliver service affected her satisfaction rating.

Both university supervisors reported high levels of overall satisfaction with the system to supervise their student teacher. On a scale of 1-5, (5 was high), respondents were rated: overall effectiveness, quality of feedback they were able to provide students, and overall satisfaction with video conferencing.

One rated the overall effectiveness as 4 and the other rated it as 5. One rated the quality of feedback given using video conferencing as average (3), while the second rated it excellent (5). Both rated overall satisfaction with the use of video conferencing as high, One as 4 and the other as 5) and said they would use it again and would recommend it to others for student teaching related activities.

Finally, both made open-ended comments to explain their ratings:

US1: "I will be using video conferencing again this fall. I was very pleased with the experience."

US2: "Conferencing is sometime(s) awkward with video conferencing, especially when I haven't met the cooperating teacher in person. The conversation is sometimes stilted and seems a little artificial. I think that's probably unavoidable because this first semester held the awe of new technology for the student teacher, the cooperating teachers, and me."

Cooperating Teachers:

Three cooperating teachers responded to the same questionnaire. All are experienced female teachers; one with 18 years teaching experience and two with nineteen. Their involvement with the student teaching program is 1 year, 4 years, and 10 years respectively, with between 1 and 6 student teachers among them. This is the first time any of them have had an IUP student teacher.

Like their university supervisor colleagues, this was the first time they had used video conferencing as part of the student teacher supervisory process. When queried about their use of video conferencing during the semester, one said she used video conferencing one time for about 45 minutes. One stated she used video conferencing between two and five times during the semester for an average of 30 minutes; and, one reported using it over five times for an average of 45 minutes each time.

Cooperating teachers also used video conferencing for planning conferences, pre-observation conferences, and post-conference activities. One reported she did not use video conferencing for planning purposes; one reported using it for planning one time for 15 minutes; and, one used it for two to five times for an average of 45 minutes. Uses of video conferencing for pre-conferencing were also varied. Two reported never using video conferencing for this purpose. One used it two to five times for 45 minutes. One cooperating teacher used video conferencing during post-observation conferences two to five times for an average of 45 minute; two reported never using video conferencing for this type activity. Two cooperating teachers reported not being involved in the midterm or final evaluations; one reports she was involved in both for about 45 minutes each time.

Data reported by one cooperating teacher regarding her use of video conferencing for the purposes of planning and pre- and post-conferencing were inconsistent with data reported by university supervisors and student teachers. There is no explanation at this time for these inconsistencies. The questionnaire has been revised, however, in hopes this will address the problem.

Positive aspects in the student teacher supervision process were also reported by cooperating teachers. Three cooperating teachers reported as positive the fact that:(1) an otherwise unavailable site was made available; (2) they got to be part of an innovative project; (3) the university supervisor was made more available; (4) they became more comfortable and confident in the use of video conferencing as the project progress; and, (5) they developed skill to use video conferencing for future activities. All three also noted the collaborative nature of the IUP/Millcreek partnership as a positive aspect of their participation in the project.

Two of the three cooperating teachers reported time saving and knowing the schedule of observations in advance as positive. One supported the positive of advanced scheduling by reporting that establishing a definite schedule of observations was a positive aspect of using video conferencing.

Open-ended remarks by cooperating teachers suggest making video conferencing available for other activities. Another commented about the positive relationship between IUP and Millcreek and suggested that the system might be used as a way for Millcreek students to observe university classes in session (to help alleviate their anxiety about attending college—important for first generation college students).

Finally, two cooperating teachers stated they would use video conferencing again. The third one reported she might use it again, but did not list the conditions that would sway her one way or the other.

Areas which cooperating teachers thought could be improved were: scheduling of observations and meetings (2), video quality (2), audio quality (2), increasing the number of observations (1), more preplanning of the entire video conferencing experience (1), more mobile equipment (1), and making the equipment more available. One cooperating teacher expanded the close-ended questions by stating:

> **CT2:** "The microphone situation is clumsy. Stationary mikes [microphones] and one clip on [microphone for]...[make it difficult] to hear pupil answers and [student] teacher needs to repeat responses for the [university supervisor]."

Overall, cooperating teachers report video conferencing effective for the supervising student teachers. One rates it 3, another 4, and another 5 on a scale of 1-5 (5 is high). They rate the quality of feedback they were able to give or receive via video conferencing high. Two rated it 4 and one rated it 5.

Cooperating teachers' overall satisfaction with using video conferencing in the supervisory process was also high. One rated it 4 and two rated it 5.

Additional open-ended comments to support these ratings were provided by several respondents. Below is a typical quote:

> **CT1:** "This proved to be an exceptional experience for all student teachers. Our child development/ distance learning project received press from local news that created public awareness. Parents were impressed and proud that their high school students were offered [the opportunity] to participate."

Student Teachers

Three student teachers participated in the pilot project begun in the Spring Semester 1996-97. Two were students in the Family and Consumer Services Education Program (Home Economics) and one was a student in the Department of Special Education.

One student reported between 2 and 5 observations by the university supervisor using video conferencing equipment; one reported over 5 observations. Observations averaged about 40 minutes each. Planning conferences were reported also by this group as an activity in which they engaged. One person reported a single planning conference of about 40 minutes, while two colleagues reported between 2 and 5 conferences averaging 25 minutes each. Pre-observation conferences were conducted for all three student teachers; one student reported participating in one conference and two reported participating in between two and five conferences of 15 minutes each. Post-observation conferences were reported as well. Two students reported one post-observation conference each. One stated the conference lasted about 10 minutes, the other reported a conference of 30 minutes in length. One student reported over 5 conferences averaging 10 minutes in length. Midterm evaluation conferences occurred for two students, and averaged 15 minutes in length.

Two student teachers reported they would both recommend and use video conferencing again as part of their student teaching activities given the opportunity. One stated s/he might use it. reporting technical problems, need for more technical support, and problems using the equipment with students who had not used it previously. No further explanation was provided and no follow-up interview was conducted. Project directors do know this response came from one of the student teachers working with special education students; and, though not reported, it is believed the respondent is referring to concerns also expressed by the university supervisor (moving special education students to a new environment where video conferencing capability was available).

Student teachers agreed that use of video conferencing was positive because: (1) it made an otherwise unavailable site available; (2) it made it possible to be part of an innovative project; and, (3) of the collaborative nature of the Millcreek/IUP partnership. Two said it helped them develop skill in the use of video conferencing for future activities. At least one reported it: (1) made the university supervisor more available; (2) made possible the establishment of a definite schedule of observations; (3) made it possible to know the schedule of observations well in advance; and, (4) made the participant more comfortable with the use of technology as the project progressed.

Areas that could be improved were also noted by student teachers. All three reported the need for more preplanning for the entire experience. One student suggested a dry run or pre-training experience. Two student teachers thought the scheduling of observations and meetings needed to be improved and that there needed to be more preplanning for each observation. One student reported that the audio

quality needed to be improved. One student also reported s/he would like to see an increase in the number of observations.

The following data were collected using a Likert-type scale of 1 to 5 (1 is low and 5 is high). Overall, two student teachers rated effectiveness of using video conferencing as 2, one reported it as 4. All were very happy with the quality of the feedback they received from supervisors using video conferencing; one rated feedback as a 4 and two rated it as 5. All three student teachers report their overall satisfaction as 4.

Student teachers provided several additional comments. One student stated:

> "I appreciated being a part of this innovative project. If any further assistance is needed please feel free to contact me."

Another stated:

> "The video conferencing was great, however it would have been more effective if the students were not taken out of their usual lrg [learning] environment (especially special ed)."

Summary Statement:

Project directors learned a number of things to help modify the project. Although very preliminary, significant findings about what works suggest that:

1. Video conferencing for student teaching supervision is effective.
2. Video conferencing works across settings and disciplines.
3. With minimal preparation, students, cooperating teachers, and university supervisors are able to use video conferencing in the supervisory process.
4. Currently available technology is sufficient to provide effective supervision of student teachers in distant locations.

Information from Phase I of this project suggests:

1. For participants, involvement in an innovative project and the availability of an otherwise inaccessible site seem to outweigh the minor technical problems.
2. Equipment location should not dictate usage, especially for students who may have special learning needs.
3. There is a need for well-planned pre-training/orientation to the use of video conferencing for supervising student teachers.
4. Human aspects of planning, scheduling, and conferencing may be more important to the perceived quality of distant supervision than technical aspects of using the video conferencing equipment.

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